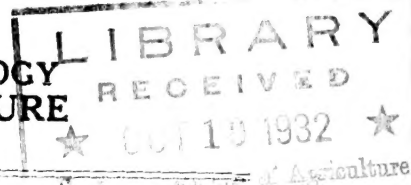


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MONTHLY LETTER OF THE BUREAU OF ENTOMOLOGY
UNITED STATES DEPARTMENT OF AGRICULTURE



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Activities for July
(Not for Publication)

August, 1932

DOCTOR HOWARD COMING HOME

Dr. L. O. Howard, who has spent the past year in Paris, France, plans to embark on the steamship Minnewaska at Havre on October 1. He expects to arrive at New York on October 10 and to be in Washington on October 11. His address after September 15 will be the Bureau of Entomology, U. S. Department of Agriculture.

GEORGE W. ELLINGTON

On August 23, 1932, while engaged in experiments on liberating hydrocyanic acid gas from a single generator, George W. Ellington was overcome by gas and died before he could be carried into the open air. These experiments were carried on in a residence in Takoma Park, Md., and were designed to obtain information on the diffusion of the gas from a single point and its effectiveness in the control of clothes moths and cockroaches.

Mr. Ellington's untimely death is deeply regretted. He was an assistant entomologist and during his ten years' association with the Bureau of Entomology has been connected with the Division of Stored Product Insects. During this period he was concerned in important investigations of grain insects and assisted in many fumigations. In addition to this, he had recently carried on experiments (the subject of a note in this number) to determine the effectiveness of paradichlorobenzene in disinfecting seeds.

FRUIT AND SHADE TREE INSECTS

Relation between citrus rust mites and sulphur residue.-- "Rust-mite counts made twice during the past month" by W. W. Yothers and R. L. Miller, Orlando, Fla., "show that there is a very definite relation existing between the quantity of sulphur residue left on citrus leaves from spraying or dusting and the number of mites present. Apparently, when there is less than .05 gram of sulphur on one kilogram of green leaves, rust mites are able to establish themselves. Lime sulphur (1-to-50) when used with kaolin or iron sulphate and colloidal sulphur (3 pounds to 100 gallons) have shown the most sulphur present by residue analysis and have had the fewest rust mites present. Lime sulphur (1-to-50) used alone was slightly better than when calcium caseinate, glue, or gum arabic were used with it. When dried blood or gum tragacanth was mixed with lime sulphur the results were the same as when lime sulphur alone was used."

Analysis of sulphur residue.---"During the month of June two analyses were made" by Ralph L. Miller and Ione Pope Bassett, of the Orlando laboratory, "of the sulphur residue remaining on the citrus foliage after it had been sprayed with solutions of lime sulphur and various adhesive materials. It was found that those mixtures containing kaolin and iron sulphate were by far the most satisfactory. In the case of the kaolin mixture, there was nearly three times as much sulphur present as when lime sulphur alone was used." As reported previously, none of the spreaders used was of any advantage in increasing the adhesiveness of sulphur, while some actually decreased the residue.

Control of tarnished plant bug on pears.---A. R. Rolfs, who has been conducting investigations of the tarnished plant bug (Lygus pratensis L.) on orchard crops at Yakima, Wash., reports: "A 20-acre block of pears was subjected to heavy disking late in November, all trash being previously scraped away from the tree trunks and turned under by the disks. No treatment was given in the spring. An adjoining pear orchard having a heavy alfalfa cover crop last year was not treated in any way. Both orchards suffered severe damage from the tarnished plant bug last year. An examination was made on June 20 of 1,100 pears on the trees in each orchard; 13.7 per cent were found injured in the untreated orchard and 3.9 per cent injured in the treated orchard. The difference was so marked that it could be noted by a casual examination of the two orchards. This treatment may be of some practical value, but it can not be used annually on account of the adverse effect on the cover crop."

Work with oriental fruit moth parasites.---The oriental fruit moth parasite investigations headquartered at Moorestown, N. J., as reported by H. W. Allen, concerns for July receipt of two importations from G. J. Haeussler, Japan, and very active work in rearing and liberating parasites---chiefly domestic. Three new types of parasites were received from Japan: Dioctes sp., Macrocentrus thoracicus Nees, and a species of Cremastus. Notwithstanding very large mortality during transit, living males and females of all these types survived in some numbers. The Diocetes were very active and there was no trouble in getting parasitization of oriental fruit moth larvae in twigs, and a considerable stock of cocoons of this species is being assembled. The living individuals of Macrocentrus thoracicus were rather inactive but these are also parasitizing twig-infesting molesta larvae. The Cremastus is under study to determine its identity and to give assurance of its being safe for liberation. The report records also the rearing of nearly 40,000 of the native Macrocentrus ancylivorus Roh. and their distribution to 15 States. Some five other parasites were concerned in rearings and distributions. A parasite, Anirocephalus stokesi Cwfd., introduced from Australia, was found to be a secondary parasite of Macrocentrus thoracicus as well as primary on the larvae of the oriental fruit moth, and all breeding stock was destroyed. In cooperation with 13 State agencies collections of infested peach twigs have been made for the purpose of determining parasitism of the oriental fruit moth larvae, and these are being held for full emergence.

Field work in Japan.--G. J. Haeussler, in charge of oriental fruit moth parasite investigations, Yckchama, Japan, reports that in June he scouted for twig-feeding larvae in 56 localities on the three principal islands of Japan--Honsu, Shikoku, and Kyushu--and also in three provinces in Chosen (Korea). A total of 42,283 infested twigs were obtained from 91 collections and forwarded to Yckchama for rearing of parasites. Some 3,282 parasite larvae or cocoons were obtained from which by the end of the month 1,380 adult parasites were obtained, representing 11 types. All information relative to such emergence is being carefully recorded and indexed as a basis for future field collections. Mr. Haeussler also reports the preparation of laboratory collections of parasite material in the immature and adult stages, duplicates of which are being forwarded to Moorestown, N. J., and the locating and mapping of fruit-growing areas.

Effect of sunshine on red scale.--Lillian Baird, Whittier, Calif., reports results of sun and shade experiments with the red scale: "The data accumulated to this time (July) seem to indicate that during the winter months a larger proportion of the scales survive in the sun than in the shade. With the coming of warmer weather the reverse is true, even to the point of practically complete kill of the newly established scales exposed directly to the summer sunshine." (Chrysomphalus aurantii M sk.)

Prepollination spraying of pecans.--Howard Baker, Shreveport, La., submits a summary of the season's work in the prepollination spraying of pecans. The experiments were made in cooperation with J. R. Cole, of the Bureau of Plant Industry "on a small scale during the season of 1930 and enlarged upon in 1931. Except for one small test no damage was caused in the tests carried out during these two years. During the present season the work was expanded and all applications were made with a power sprayer. * * * No injury of any kind resulted to either the foliage or the tender nut clusters. The ravages of the insects present were controlled and infection of diseases delayed or prevented. As a result of these prepollination tests, conducted over a three-year period, it is concluded that pecan trees can be sprayed with safety even when young, tender pistillate bloom is present. * * * In the tests conducted this year a 1-10-50 calcium arsenate spray controlled the insects present at the time the spray was applied and a 2-3-50 Bordeaux mixture was sufficiently strong to delay or prevent disease infection."

Spraying and dusting experiments for control of the plum curculio.--Oliver I. Snapp and J. R. Thomson, Fort Valley, Ga., have completed a series of experiments for the control of the plum curculio (Conotrachelus nenuphar Hbst.). Notwithstanding certain difficulties (including a light crop and a belated change in experimental plots because of the unexpected loss of the crop in the portion of orchard originally selected), the results appeared rather clear cut and indicated that barium fluosilicate and potassium fluosilicate are approximately equivalent to lead arsenate in effectiveness and that cryolite is nearly as effective. Potassium fluosilicate, however, caused considerable injury to the fruit

and a little injury to the foliage. Barium fluosilicate and cryolite, on the other hand, caused no injury of consequence. Dusting with lead arsenate, as in previous years, was found much less effective than applying the material as a spray.

JAPANESE BEETLE AND ASIATIC BEETLE RESEARCH

New host plants of Japanese beetle.--Henry Fox, Moorestown, N. J., reports that the Japanese beetle had added several food plants in the Pine Barrens to its list. "In addition to feeding voraciously upon the bracken and cinnamon fern, it now defoliates shining sumac (Rhus copallina) and the tough-leaved scrub oak (Quercus ilicifolia). Numerous other plants characteristic of the Pine Barrens are fed upon also. Frequent grassy areas and margins furnish proper conditions for the development of larvae throughout the pine region." He reports also that his belief that the northern bayberry, Myrica carolinensis, may be attacked by the Japanese beetle is based on damage rather than on actual observation of feeding.

Japanese lettuce and not "dwarf dandelion" attractive to Japanese-beetle grubs.--In the June Monthly Letter it was noted that grubs were unusually numerous around dwarf dandelion (Adopogon carolinianum). "The determination of this plant," reports I. M. Hawley, "was made by members of the laboratory staff but later, as there was some question as to the correctness of this identification, specimens were turned over to botanists of the Academy of Natural Sciences in Philadelphia. They report that it is apparently Lactuca stolonifera, a plant native to Japan."

Repellency of paradichlorobenzene to oviposition of Japanese beetles.--J. W. Lipp, Moorestown, reports that "When the chemical was placed on the surface of the soil no ovipositional repellency was noted if the pots were in the sunlight, possibly because the material evaporated so readily. If the pots were in the shade fewer eggs were found in treated than in untreated pots. When cages of beetles were placed over soil containing paradichlorobenzene at the rate of 10 pounds per cubic yard, no eggs were found. * * * In outdoor tests beetles confined in cages (3 feet by 3 feet) were given opportunity to oviposit in both treated and untreated soil. In one series, 4-inch pots were plunged in untreated soil; half were covered with untreated soil, the other half with soil containing paradichlorobenzene (10 pounds per cubic yard). One-half cubic foot of this mixture was sufficient to cover 56 pots, or about 1 square yard of surface, which was equivalent to a dosage of approximately 3 ounces of chemical per square yard of surface. No eggs were found in the pots covered with treated soil, whereas the pots covered with untreated soil averaged about 35 eggs per pot at the end of 3 days. Many dead beetles were found in the treated pots."

Rotenone inefficient as an insecticide against the Japanese beetle.--M. R. Osburn, Moorestown, says: "Contact and stomach poison tests with suspensions of rotenone as concentrated as 1-to-200 show very poor results in killing the adult Japanese beetle."

Castor bean plant ineffective as a killing agent for Japanese beetle.--"A visit was made to the Landreth field plots at Bristol on July 20," reports F. W. Metzger, Moorestown, "to observe feeding on the plants. Few beetles were seen feeding and the number dead was negligible. No serious injury was seen on the plants, although soy beans in the immediate vicinity were badly damaged. The Landreth officials stated that feeding by large numbers of beetles does not occur until the plants are several feet high, or until about the middle of August. Few beetles have fed on the various varieties planted at the laboratory and the cage tests have given negative results so far as mortality is concerned."

Electrostatic trap inferior to funnel trap for Asiatic garden beetle.--H. C. Hallock, Westbury, N. Y., reports that "The study of traps has been continued in 1932. The large funnel trap has caught a total of 51,954 Asiatic garden beetles during July. The largest catch in any one night (in this trap in 1932) was 11,598. At another locality observations were made on an electrostatic trap which electrocuted the beetles after attracting them to the light. This trap captured 9,261 beetles in 13 days, the largest catch being 1,818 in one night."

TRUCK CROP AND GARDEN INSECTS

New parasite of flea beetles discovered.--"Possibly the most outstanding new discovery," says Neale F. Howard, Columbus, Ohio, "is the finding (by Alvah Peterson) of a new species of *Perilitus* that attacks adult flea beetles, particularly species of *Phyllotreta*, namely *vittata* Fab. and *bipustulata* Fab. To date this parasite appears to be important in at least three hosts. Field collections have shown parasitism approximating 70 per cent. Early in July, when beetles were abundant, collections about Columbus ran between 60 and 80 per cent and late in July, when the population of beetles in the field was low, the parasitism ran between 20 and 40 per cent. The parasite has been found in hosts taken at Columbus, Wooster, and Athens, Ohio."

Barium fluosilicate diluted with tobacco dust controls tobacco flea beetle.--F. S. Chamberlin, Quincy, Fla., reports that "Field experiments with diluted barium fluosilicate have been continued this month (July). The investigations this season have shown quite conclusively that control measures properly applied early in the season will prevent the production of a disastrous third brood of flea beetles in the latter part of the growing season. There were, however, numerous instances of severe third-brood infestations throughout this region. Control measures were directed against these infestations with excellent results."

Longevity of tobacco stalk borer in Arizona.--K. B. McKinney, Tempe, Ariz., has just completed a set of longevity experiments with adult tobacco stalk borers. He submits the following summary of results: "106 adults were used in this set of experiments; 96.2 per cent lived more than 45 days; 90.5 per cent, 90 days; 66.0 per cent, 120 days; 23.5 per cent, 150 days; 13.2 per cent, 180 days; 3.3 per cent, 210 days; 1.8 per cent, 225 days."

Wireworms in Mississippi crawl on surface of soil.--K. L. Cockerham, Biloxi, Miss., reports that "On several occasions wireworms have been observed crawling on the surface of the ground, without protection of any kind. On the afternoon of July 26, in the space of a half hour's time, 3 larvae of Heteroderes laurentii Guer. were found crawling along the bottom of furrows in a field. These were not freshly plowed furrows, as it was after heavy rains had fallen in the fields. The afternoon was cloudy and the soil was damp. One of these larvae was observed to traverse a space of 5 feet in less than 10 minutes, before reentering the soil."

Developmental zero for eggs of Limonius californicus.--"Quite a little time ago an experiment was started," reports C. E. Woodworth, Walla Walla, Wash., "to determine the developmental zero for the eggs of the wireworm Limonius californicus Mann. Like Limonius canus Lec., the 'zero' for L. californicus was found to be about 54.5° F. The rate judged for development from mating to hatching of the first egg was 55.8° F. The incubation time, however, indicated 53.2° F. as the zero point. There is, as was noted in L. canus, a decided change of rate of development, both at high and low temperatures, producing a figure 5 curve when plotted."

Soil flooding kills two species of Limonius.--E. W. Jones, Walla Walla, reports that "During the month of July two soil submergence experiments were completed in the laboratory yard. Several thousand larvae of L. canus Lec. and L. californicus Mann. were buried in laboratory soil cages at depths of 3, 6, 9, and 12 inches. The cages were then flooded with water. The first experiment was run for 3 weeks and the second for only 1 week. These flooding tests on wireworms show that a 94.5 to 98.7 per cent mortality of wireworms results when soil is flooded for 1 week at an average temperature of 74° F. in the first foot of soil. These experiments also show that a 3-weeks' submergence period at 72.5° F. results in approximately 100 per cent kill of the larvae."

FOREST INSECTS

Shipments of satin-moth parasites.--C. W. Collins, Melrose Highlands, Mass., reports shipments of 1,500 puparia of Compsilura concinnata Meig. to R. W. E. Tucker, Department of Agriculture, Barbados, B. W. I.; 1,996 to C. F. Doucette, Sumner, Wash.; and 700 to A. B. Baird, Belleville, Ontario, Canada. This material was collected by J. A. Millar for shipment outside of New England to aid in controlling local infestations of the satin moth.

Parasites of the elm leaf beetle received from Austria.--P. A. Berry, of the Melrose Highlands laboratory, reports that a total of 10,115 adults of Tetrastichus xanthomelaenae Rond. have emerged from shipments of elm leaf beetle eggs sent by W. F. Sellers of the Budapest, Hungary, sublaboratory and from a previous shipment from H. L. Parker, Hères, France. "Mr. Berry exposed some elm leaf beetle eggs to attack by T

xanthomelaenae and others to attack by Tetrastichus sp. and reports that adult parasites are emerging from both lots. He also exposed eggs that had been exposed to attack by one parasite to attack by the other and in all cases observed that only adults of the species to which the eggs were first exposed developed. No true secondary parasitism was observed, although there is competition, as only one parasite has been found in a beetle egg. Mr. Berry adds, however, that 'there is a possibility that more than one may develop in the same egg.'"

White-grub problem.--R. A. St. George, Asheville, N. C., says that "During the month of July reports and specimens were received from J. S. Holmes, State forester of North Carolina, to indicate that many of the white-grub larvae at the State Nursery, located near Clayton, have been heavily parasitized. The parasitic larvae superficially resembled those of a robber fly. They have been submitted for determination. Several entire seed beds have already been lost this year and Mr. Holmes expressed the hope that the mortality would be high and that the grubs would be controlled by this enemy. No damage has been reported to the arsenic-treated beds established this spring.

Control of mountain pine beetle in Crater Lake National Park.--F. P. Keen, Portland, Oreg., reports that "The season's program of mountain pine beetle control in the pine stands of Crater Lake National Park was completed on July 25, and the two camps employing about 50 men were disbanded. For the first time since this project was started in 1925 the entire infested area of the southern half of the park and adjacent National Forest lands was completely covered with the control operations, all infestation found was treated, and the cost of the work was kept within the original estimate and allotment. More than 20,000 trees were treated."

Western pine beetle yields slowly to oil sprays.--K. A. Salman and P. C. Johnson, Berkeley, Calif., report that "An additional series of about 20 trees infested by summer broods of the western pine beetle were felled during the period July 19 to 29 and treated with oil sprays provided by the Standard Oil Research Laboratory. Results as found in preceding experiments indicate that the toxic effect of these oils is very slow in its operation and that insects in the larval stages do not die for some time after application of the oils. Owing to the rather promising developments shown by the trees that were treated last spring, considerable time has been devoted to this experiment in the hope that a method can be developed that will make it possible to treat trees during the summer season, when burning is impracticable, or during the early stages of brood development while the bark is still tight and peeling is a very expensive operation. One experiment carried out by Chemist Gay of the Standard Oil Laboratory during the latter part of June consisted of spraying with oil a standing lodgepole tree infested by the mountain pine beetle. This tree was examined by Mr. Salman on July 15, when none of the insects could be found alive, all apparently having succumbed to the action of the oil. Owing to the promising results secured, further experimentation with lodgepole is planned during August."

CEREAL AND FORAGE INSECTS

Lead arsenate effective in control of cutworms.--W. B. Noble, West Lafayette, Ind., reports as follows on the use of lead arsenate against cutworms: "Lead arsenate was mixed with dry sand, at the rate of 3 pounds per bushel, and applied with a fertilizer drill to 1,000 square feet; this material was not washed down; greens were watered regularly about 24 hours after application. Examination 3 days after treatment indicated that practically all worms had been killed. This treatment appeared to be very effective against the worms and is to be recommended, inasmuch as the lead arsenate is reported to reduce weeds and to have a beneficial effect on the bent-grass turf as well. The cost of materials is about 2 cents per square yard. This insecticide is less expensive and easier to make and apply than kerosene emulsion."

Poison bait for grasshoppers.--J. R. Parker, Bozeman, Mont., reports that "Further work by R. L. Shotwell at Crookston on poisoned bran mash consisted of plot and cage method to determine relative values of cane and beet molasses in the bait formulae and the relative efficiency of sodium fluosilicate versus white arsenic. These experiments were still in progress at the end of the month and were being carried on with adult grasshoppers. This necessitated larger and more widely separated plots. The results, though not yet complete, indicate that quicker kills are obtained by using the fluosilicate but the total effectiveness over several days for this poison is about 10 per cent lower than for the arsenic. In other words, the mortality for the fluosilicate is greatest the first day after spreading the poison, whereas with the arsenic it is the second day, with a greater mortality over the total four days' observation. An explanation of this is that for the hoppers that have gorged themselves on the fluosilicate mass beyond the lethal dose the effect is quicker and recovery more sure from smaller dosages than for those that have fed on the arsenic. A lethal dose of sodium fluosilicate acts faster than a lethal dose of arsenic, but the chance of obtaining a lethal dose of fluosilicate is less than that for arsenic."

Generic name of alfalfa weevil becomes Hypera instead of Phytonomus.--According to an opinion expressed by L. L. Buchanan, of the Bureau taxonomic staff, in a memorandum dated August 10, 1932, the generic name Phytonomus, which has been in general use in this country for many years, must be sunk in favor of Hypera, which has undoubted priority over it. Phytonomus can not be retained even as a subgeneric name for this insect, as it is not valid for that purpose. Technical workers are requested to be governed accordingly.

H. D. Smith, who left on July 27 for Italy for the summer collecting drive of parasites of the European corn borer, reports that the infestation in northern Italy is this year much below the average. He visited a considerable number of cornfields and found an average infestation of 20 per cent, with only one field having an infestation of 63 per

cent. He reports that parasitism by *Phaeogenes* ranges from 2 per cent to 10 per cent, and he expects to be able to send this summer from 20,000 to 30,000 parasites.

COTTON INSECTS

Heavy rainfall brings out thurberia weevil.--Reporting observations on thurberia plants and weevils in the mountains, T. P. Cassidy, Tucson, Ariz., says: "Prior to June 28 less than 1 per cent of the weevils under observation that had hibernated in thurberia bolls of the 1931 crop had emerged. From June 28 to July 14 a total of 5.39 per cent emerged. During this same period a total of 2.39 inches of precipitation was recorded at the experimental ranch located about 25 miles west of the thurberia plants under observation in the mountains. While the rainfall may have been more or less in the mountains, the records at the ranch give a general idea of the quantity of rainfall for that section of the country. The weevil emergence from July 14 to August 1 was 51.15 per cent and during this period 4.26 inches of precipitation was recorded. The heavy emergence of weevils from their pupal cells in thurberia bolls in the mountains during July is attributed to heavy rainfall."

Influence of soil moisture on hibernation of pink bollworm.--H. S. Cavitt and J. M. Yeates, Presidio, Tex., who have been making soil moisture determinations to ascertain the actual percentage of moisture in the soil, report that "The results show that approximately 15 per cent soil moisture in both sandy and adobe soils was near the optimum for survival (of the pink bollworm) in 1931-32. A fairly high percentage of survival was recorded from bolls in both soil types maintained at approximately 5, 10, or 22 per cent soil moisture. Survival was less than 1 per cent from dry soils and there was no survival in soils kept more or less saturated with water. * * * As a contrast to results obtained in some years, the emergence was greater from bolls in the sandy soil than from those in the adobe soil. The total survival was 13.27 per cent, the lowest per test was nothing, and the highest 56.82 per cent."

Boll weevil survives winter best in the woods.--"From the results of the cage hibernation work," reports F. F. Bondy, Florence, S. C., "it was found that more boll weevils will survive the winter in the woods than in the open field; Spanish moss and cornstalks are about equally good, and leafage is the best material for weevil hibernation. The weevils that were put in hibernation on October 15 gave a larger percentage of survival. This is probably a good average date for the beginning of natural hibernation; and November 1 for the end of natural hibernation in this section."

INSECTS AFFECTING MAN AND ANIMALS

Trapping reduces incidence of myiasis.--H. E. Parish, Menard, Tex., reports that "Records of new screw worm cases during the month of

July show 523 cases in all classes of livestock in the trapped area and 743 cases in the nontrapped area. The average animal population for the month was 122,112 in the trapped and 91,727 in the nontrapped area. If we express the number of cases in each of the two areas in percentage of animals infested it will be noted that the cases of myiasis in the trapped area were reduced approximately 47 per cent."

Nicotine sulphate efficient blowfly larvicide.---In July E. W. Laake, Dallas, Tex., completed several tests on the toxicity and effects of nicotine sulphate and dipyridyl oil as larvicides in blowfly baits. He says: "The bait used consisted of 2 pounds of boneless beef to 1 gallon of tap water, exposed in sterilized gray enameled bait pans under standard size cone-type traps. The duration of each test was 20 days. All of the traps were rotated daily in order to equalize as nearly as possible the difference in locations of traps. During the 20-day exposure of the baits, a pH test was made daily and the number of blowfly eggs deposited on the bait and the number of larvae, dead or alive, in the bait were estimated as closely as possible. * * * In all of the tests the traps were placed on a concrete dock along the fertilizer department of a Dallas packing plant, where flies are always abundant, and it is certain that prevailing conditions are admirably adapted for a fair test in every respect. * * * Conclusions are very definite that 3 cc of nicotine sulphate per gallon of water is sufficient to secure a control for the larvae and to obtain the greatest efficiency for volume of flies caught."

Wound disinfection by blowfly maggots.---William Robinson, Washington D. C., in cooperation with Doctor Norwood, has for several months been making a study of the use of maggots in the treatment of osteomyelitis. He reports: "The work was done chiefly in Baltimore, Md., in the Church Home and Infirmary. * * * Our purpose was to find out how maggots bring about wound disinfection. Maggots were taken directly from wounds, and aseptic dissections under a microscope were made of the alimentary tract to determine the fate of the disease-causing organisms in their passage through the 'stomach' of maggots. Repeated cultures showed that maggots are able to destroy bacteria by digestion and that destruction takes place mainly in the mid-stomach. The contents of the intestine were invariably found to be sterile, although the fore-stomach was always heavily contaminated. Maggots were also found to hasten disinfection of the wound through their scavenging effect by consuming large quantities of the necrotic tissue of the wound. They also cause the wound to secrete freely a serous liquid and as this flows from the wound it carries off large numbers of bacteria in the excess discharge."

Colloidal Paris green as a mosquito larvicide.---G. H. Bradley and T. E. McNeel, Orlando, Fla., report that "Results of tests made with this material in the laboratory in clear rain water show that it will kill larvae of Culex quinquefasciatus Say and Anopheles crucians Wied. in the laboratory at dilutions up to 1 part of Paris green to 1,000,000 parts of water. Greater dilutions have given negligible killing. Prac-

tical tests in rain barrels against C. quinquefasciatus and Aedes aegypti L. have shown that a greater concentration of this poison is necessary. In one barrel in which a bacterial scum was continually forming, a strength of 1-to-250,000 gave negligible results, whereas in another barrel with more or less clear water a concentration of 1-to-400,000 gave a complete kill. In a barrel treated at the rate of 1-to-333,333 only a few larvae died; however, although Culex egg boats are being laid on the water each night, no young larvae have been noted developing. It would appear that an abundance of food in the water keeps the larvae from ingesting a lethal quantity of the poison, and that newly hatched larvae are more susceptible than older ones."

STORED PRODUCT INSECTS

Notes on pea weevils.--Tom Brindley, Moscow, Idaho, reports as a result of a series of experiments in burying weevil-infested peas 3½ inches in the ground that "it is readily apparent from these experiments that weevils can escape in considerable numbers from planted peas, especially if the soil temperature is fairly warm." Mr. Brindley also reports that weevils will lay eggs on pods from the time they emerge from the blossoms until the pods begin to wrinkle and harden, but that when pods of all sizes are available they show a preference for the larger partially filled pods.

Tobacco moth more resistant to hydrocyanic acid gas than is cigarette beetle.--Experiments by W. D. Reed and assistants, Richmond, Va., on the effectiveness of fumigation of tobacco warehouses has brought out the significant fact that "The larvae of Ephestia elutella Hbn. showed approximately 10 per cent greater resistance to hydrocyanic acid gas than did larvae of Lasioderma serricorne Fab. in these experiments."

Diamalt bait attractive to tobacco moth.--"Further data were secured in Richmond during July," states Mr. Reed, "on the effectiveness of diamalt bait for attracting adults of Ephestia elutella. This bait has proved more attractive than light traps."

Raisin moth in figs controlled by disposal of fallen fruit.--Perez Simmons reports a study by H. C. Donohoe, assisted by H. O. Lunn, of the relation of the infestation of the first crop of Mission figs with the raisin moth to the later infestation of the main crop. This examination concerned both picked and fallen fruit of the first crop. He states that "Of the 306 larvae of Ephestia recorded, only 3 were from figs picked from trees. This is in line with our previous findings that infestation by moths of figs on trees is not extensive. The extensive infestation of fallen first-crop figs, as revealed by Mr. Donohoe's work, makes a stronger case for sanitary disposal of this waste fruit, which is usually allowed to remain in the orchard * * * It also aids in explaining the presence of a large population of Ephestia adults during the drying of the main crop."

New uses for paradichlorobenzene.--George W. Ellington, Sligo, Md. reports that batches of eggs of Sitotroga cerealella Oliv., Plodia inter-

punctella Hbn., and Ephestia kuehniella Zell., fumigated by being placed for 3, 6, and 24 hours, respectively, in a saturated atmosphere obtained by use of paradichlorobenzene crystals, resulted in a 100 per cent kill with the 6-hour or longer fumigation. The examinations were continued both as to the treated eggs and a check lot over a 10-day period. Similar fumigation of adults of the confused flour beetle (Tribolium confusum Duv.) resulted in 100 per cent kill after 1-hour exposure, whereas a 5-hour exposure was necessary for 100 per kill of the larvae. A 2-hour exposure was sufficient to kill the larvae of Ephestia kuehniella and a 1-hour exposure to effect a similar kill of adults of the rice weevil (Sitophilus oryza L.).

Paradichlorobenzene inhibits feeding of clothes-moth larvae.---Wallace Colman, Silver Spring, Md., has been testing the effect of paradichlorobenzene upon the feeding of larvae of the webbing clothes moth (Tineola biselliella Hum.) held at a constant temperature of 25° C. "There was no feeding in the treated jar and very light webs were formed, whereas in the check jar there was heavy feeding and strong webs were formed. A series of tests under practical conditions and at normal temperatures, in which half the larvae were fumigated continuously and the other half only on alternate weeks, shows clearly the lag effect of paradichlorobenzene vapor upon the feeding of larvae of the webbing clothes moth."

Mr. Colman also reports an experiment with evaporation of paradichlorobenzene crystals in a small shellacked closet constructed of wall board. After this fumigation the closet was opened and aired for 4 1/2 hours. In the closet were then placed 10 clothes moths on woolens, and the closet was closed. After 30 days 4 larvae were still alive and there had been no feeding. At the end of 60 days there were 2 living larvae and 1 of these had resumed feeding. Mr. Colman believes that the closet had initially received an excess of the paradichlorobenzene over that required to saturate the air and that "A large part of the excess must have been taken up by the walls, later to be given off as an effective fumigant. The test was conducted at room temperature, averaging 75° F. When the fumigation period is lengthy or continuous, the absorbed paradichlorobenzene would constitute a buffer or reserve supply of fumigant to be taken up by the air of the closet when the concentration fell below a certain point."

TOXICOLOGY AND PHYSIOLOGY OF INSECTS

Loss of toxicity of rotenone in sunlight preventable.---F. L. Campbell and W. N. Sullivan, Takoma Park, Md., report on experiments in which "Mosquito larvae were used as test insects to determine the effect of light on the toxicity of rotenone, dihydrorotenone, rotenone hydrochloride, and mixtures of rotenone with bentonite and with lampblack. It was found that the toxicity of all the materials just named was more or less reduced by exposure on glass plates to sunlight for 10 and 20 days and to an arc light for periods equivalent to about 1 and 2 months'

exposure to sunlight. The extent of detoxication was generally proportional to the period of exposure. In only three cases was more than 40 per cent of the original toxicity retained, i. e., dihydrorotenone exposed to sunlight for 10 days, 68 per cent; rotenone-lampblack exposed to sunlight for 10 and 20 days, 63 per cent and 71 per cent, respectively. The results with a 1-to-1 mixture of rotenone and lampblack show that the detoxication of rotenone by sunlight can be largely prevented by mixing it with a light-absorbing substance. The prevention or retardation of detoxication of rotenone spray or dust residues by sunlight may therefore be considered attainable."

Growth of roaches stunted by brief exposure to cold.--"The influence of temperature on the growth of an insect is well illustrated by a current experiment on the American roach," reports M. C. Swingle, Takoma Park. "Two groups of roaches have been reared side by side for the past 18 weeks in an insulated room at about 82° F. Both groups were fed on oatmeal, lettuce, and tap water and had identical environmental conditions, excepting that one group was removed from the room every 5 days and placed in a cold room (32°) for 15 minutes--just sufficient time and temperature to chill the insects into inactivity and not to seriously injure them. The average weight of the insects kept at 82° is now about 1,000 milligrams. The weight of those that were chilled every five days is now about 225 milligrams, or less than 25 per cent of the weight of those kept under constant temperature. It is rather hard to see why this short exposure (15 out of each 7,200 minutes) influences them to such a degree, especially as the roaches quickly recover on being returned to the warm room. The chilling effect is evidently a complex one."

BEE CULTURE

Nevada adopts U. S. standard grades for honey.--"Word has been received," reports Jas. I. Hambleton, Somerset, Md., "that the State Board of Stock Commissioners of the State of Nevada has officially adopted the United States Standard Grades for honey. Although several States have under consideration the matter of the official adoption of the U. S. Grades for honey, Nevada is the first State to take definite action. Arrangements are now under way for the grading and certification of the bulk of the Nevada honey crop."

German bees excel Italians in tolerance of buckeye poison.--Geo. H. Vansell has concluded the buckeye-honey feeding experiment with various races of bees at Davis, Calif. He says: "Experimental evidence further strengthens the position taken from field observations that the original black (German) stock of bees is able successfully to surmount a moderate buckeye exposure, whereas the Italians are not. The introduction of Italian stock, practiced so extensively, led to serious difficulty and even failure in many locations where beekeeping had previously been somewhat of a success. Apiaries of black bees are still intact (operated since 1871) in parts of the Sierra foothills where Italian bees, recently introduced upon the advent of better roads, have been so seriously af-

fects as to prove unprofitable. However, there are localities in which buckeye is so abundant that it appears doubtful if beekeeping could be profitable with any race of honeybees without special management to circumvent exposure of the brood."

California "native" bees determined as German blacks.--E. L. Sechrist, Davis, Calif., reports that "Several samples of the 'native California black bees' from the two lots that we now have at Davis, one being brought by Todd and Sechrist from Humboldt County, California, and the other coming from Mr. Kimball of Amador County, were sent to Warren Whitcomb of the southern field laboratory, Baton Rouge, La., for examination. After making measurements of these he reports that he finds them in no way different from the common black, or German, bee. It is therefore quite probable, as has been believed by most investigators, that these black bees are descendants of the original black colonies that were first brought from the East to California. The bees from Amador County are in the hands of the son of the original owner of the stock and they have been in the same location without introduction of queens since 1871. Of the Humboldt bees we have no reference except the statement that they have 'always been in that region.'"

Wax moth devours phonograph record.--"The variety of foods that the larvae of Galleria mellonella L. will eat and apparently thrive on is astonishing," reports Warren Whitcomb. "One larva fed on a dictaphone cylinder and pupated in the cloth lining of the cylinder carton. Pure wax is not an ideal food, and larvae fed on it are small and transform into small adults."

Bee necessary to upkeep of stock ranges.--Dr. Arthur W. Sampson, Plant Ecologist of the University of California, was consulted in July by specialists of the Davis, Calif., field laboratory concerning the value of bees to the maintenance of California stock ranges, honey plants in the various life zones of the State, and the arrangements of life-zone tables for use of beekeepers in the Sierra Nevada and Cascade Ranges. It is of particular note that Dr. Sampson was very positive in his statement that bees were of high importance in keeping up the stock ranges because of their activities in pollinating the various wild range plants. Without bees, he said, the ranges soon deteriorated.